

IN THE CLAIMS:

Please amend the claims as follows:

Claim 1 (currently amended): A method of designing and manufacturing an artificial joint stem ~~which uses composite materials, comprising~~ with the use of a composite material comprising:

a first external layer, which is inserted and fixed in an insertion hole formed in a bone without filling cement, torsional stiffness thereof is increased as contacting an internal surface of said insertion hole;

a main structure layer, which is positioned in an inner side than said first external layer, bending stiffness thereof is increased;

a core layer with lower stiffness than the main structure layer and the first external layer, which is positioned in an inner side than said main structure layer; and

a most inner layer, which is positioned between the core layer and the main structure layer;

steps of performing, as using a computer, an analysis involving an internal stress of said artificial joint stem and an adhesive stress of said artificial joint stem and ~~a~~ the bone based on three dimension data indicating a structure of said bone made by using plural bone tomographic images and a design condition involving a form and stiffness of said artificial joint stem configured at least by one of said tomographic images and said three dimension image;

having said computer to reanalyze as changing said design condition if a result of said analysis fails to satisfy said design condition; designing and manufacturing said artificial joint stem using stem data based on said result of said analysis and said design condition if said result of said analysis satisfies said design condition.

Claim 2 (currently amended): The method of designing and manufacturing the artificial joint stem with use composite materials according to claim 1, ~~wherein an external form of an epiphysis approximately fitting an internal form of an insertion hole formed in said bone, said artificial joint stem has a main part with stiffness around a boundary between epiphysis and diaphysis varies so as to lower the stiffness as approaching the diaphysis and a neck to place a spherical head in said artificial joint thereon~~ further comprising step of performing analysis including the internal stress of the bone analysis using the finite element.

Claim 3 (currently amended): The method of designing and manufacturing the artificial joint stem which uses composite materials according to claim 2, ~~wherein said artificial joint stem further comprises a guide section, provided at a forefront side of the main part and placed at the diaphysis, said guide section has a lower bending and stretching/tensile stiffness than said main part~~ said tomographic image is a tomographic image, which is obtained by different transmission speed of the layers of the bone, and further comprising a step of analyzing the internal stress of the bone as determining the Young's modulus and the density of every element of the bone based on the relation of the predetermined density and Young's modulus of the bone and the transmission speed.

Claim 4 (currently amended): The method of designing and manufacturing artificial joint stem which uses composite materials according to claim 1, further comprising a step of analyzing the internal stress of said bone using the finite element method forming as superposing the composite materials of the first external layer, the main structure layer, and the core layer by molding in a die.

Claim 5 (original): The method of designing and manufacturing artificial joint stem which

uses the composite materials according to claim 1, further comprising a step of forming a model of said artificial joint stem or a forming die.

Claim 6 (original): The method of designing and manufacturing artificial joint stem which uses the composite materials according to claim 1, further comprising a step of obtaining a material of the composite materials for the use in forming said artificial joint stem as controlling an automatic cutter based on the stem data.

Claim 7 (original): The method of designing and manufacturing artificial joint stem which uses the composite materials according to claim 1, further comprising a step of displaying a lamination layer position of the composite materials used in forming said artificial joint stem in a forming die of said artificial joint stem based on the stem data.